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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/597,780	06/20/2000	Alessandro Cesare Callegari	YOR-9-2000-0010	6159

7590 12/26/2006  
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EXAMINER
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NGUYEN, HOAN C

ART UNIT	PAPER NUMBER
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2871

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/26/2006	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

09/597,780

Applicant(s)

CALLEGARI ET AL.

Examiner

HOAN C. NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 9,11-13,37 and 40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9,11-13,37 and 40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/20/2006 has been entered.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9, 11-13, 37 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh et al. (US6665036B2) in view of Kim et al. (US006111627A), Hiroshi (US5995186A), and Callegari et al. (US6061114A).

In regard to claims 9 and 37, Oh et al. teach (Fig. 3A-B) a multi-domain liquid crystal display comprising

- a bottom substrate 210 having a first surface;

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- a transparent conductive layer (data electrodes 208 and common electrode 209, thin film transistors and other display circuitry in bottom substrate to form the in-plane switching mode) disposed over said first surface of said bottom substrate.
- a top substrate 211 having a second surface;
- a color filter layer (color filter 229) disposed over a surface of the top substrate;
- a transparent conductive layer 118 disposed over said color filter;
- a first alignment layer 223a over said first transparent conductive layer
- a second alignment layer 223b made of over said second surface; said second alignment layer being spaced adjacent to and facing said first alignment layer;
- a liquid crystal material 230 disposed in the space therebetween;

wherein

However, Oh et al. fail to disclose

- (a) a second transparent conductive layer disposed over the color filter;
- (b) a plurality of uniformly sized spacer 108 distributing within said space;
- (c) the alignment layers made of the dry deposited layers, which are made of material selected from the group consisting of hydrogenated diamond-like carbon, amorphous hydrogenated silicon, silicon carbide (SiC), silicon dioxide (SiO<sub>2</sub>), glass, silicon nitride (Si<sub>3</sub>N<sub>4</sub>), alumina (Al<sub>2</sub>O<sub>3</sub>), cerium(IV) oxide (CeO<sub>2</sub>), tin oxide (SnO<sub>2</sub>), zinc titanate (ZnTiO<sub>2</sub>) and a combination thereof;
- (d) each of said first alignment layer and said second alignment layer made of the dry deposited layers is divided into a plurality of pixels each having a boundary and at least two domains; wherein each of said multi-domain, dry deposited layers is

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obtained by a mechanical mask; said dry deposited layers are exposed to at least a first particle (ion) beam treatment and a second particle (ion) beam treatment, where a first particle beam and a second particle beam use the same ion, which is selected from the group consisting argon, nitrogen, oxygen and a mixture thereof; and a direction of said first particle beam treatment with respect to said dry deposited layer is different than a direction of said second particle beam treatment with respect to said dry deposited layer.

Kim et al. teach (Fig.4) (a) a second transparent conductive layer disposed over the color filter, which is formed on the surface of upper substrate; this second transparent conductive layer used for preventing electrostatics forming on the upper substrate (col. 3 lines 1-3). Kim also discloses the alignment layers 44 and 28.

Hiroshi teaches (Fig. 5) (b) a plurality of uniformly sized spacer 108 distributing within said space for supporting the thickness of liquid crystal layer (col. 5 lines 25-29).

Callegari et al. teach

(c) the alignment layers made of the dry deposited layers, which are made of material selected from the group consisting of hydrogenated diamond-like carbon, amorphous hydrogenated silicon, silicon carbide (SiC), silicon dioxide (SiO<sub>2</sub>), glass, silicon nitride (Si<sub>3</sub>N<sub>4</sub>), alumina (Al<sub>2</sub>O<sub>3</sub>), cerium(IV) oxide (CeO<sub>2</sub>), tin oxide (SnO<sub>2</sub>), zinc titanate (ZnTiO<sub>2</sub>) and a combination thereof for requiring fewer steps and less cost to manufacture (col. 3 lines 51-58);

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(d) each of said first alignment layer and said second alignment layer made of the dry deposited layers is divided into a plurality of pixels each having a boundary and at least two domains; wherein each of said multi-domain, dry deposited layers is obtained by a mechanical mask 966; said dry deposited layers are exposed to at least a first particle (ion) beam and a second particle (ion) beam, where a first particle beam treatment and a second particle beam treatment use the same ion, which is selected from the group consisting argon, nitrogen, oxygen and a mixture thereof; and a direction of said first particle beam treatment with respect to said dry deposited layer is different than a direction of said second particle beam treatment with respect to said dry deposited layer with the features of claim 11 for resulting multidomain device so that attributing large view angle (col. 6 lines 19-31).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a multi-domain liquid crystal display as Oh et al. disclosed with (a) a second transparent conductive layer disposed over the color filter, which is formed on the surface of upper substrate; this second transparent conductive layer used for preventing electrostatics forming on the upper substrate (col. 3 lines 1-3) as taught by Kim et al.; (b) a plurality of uniformly sized spacer 108 distributing within said space for supporting the thickness of liquid crystal layer (col. 5 lines 25-29) as taught by Hiroshi; (c) the alignment layers made of the dry deposited layers, which are made of material selected from the group consisting of hydrogenated diamond-like carbon, amorphous hydrogenated silicon, silicon carbide (SiC), silicon

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dioxide ( $\text{SiO}_2$ ), glass, silicon nitride ( $\text{Si}_3\text{N}_4$ ), alumina ( $\text{Al}_2\text{O}_3$ ), cerium(IV) oxide ( $\text{CeO}_2$ ), tin oxide ( $\text{SnO}_2$ ), zinc titanate ( $\text{ZnTiO}_2$ ) and a combination thereof for requiring fewer steps and less cost to manufacture (col. 3 lines 51-58); (d) each of said first alignment layer and said second alignment layer made of the dry deposited layers is divided into a plurality of pixels each having a boundary and at least two domains; wherein each of said multi-domain, dry deposited layers is obtained by a mechanical mask 966; said dry deposited layers are exposed to at least a first particle (ion) beam and a second particle (ion) beam, where a first particle beam treatment and a second particle beam treatment use the same ion, which is selected from the group consisting argon, nitrogen, oxygen and a mixture thereof; and a direction of said first particle beam treatment with respect to said dry deposited layer is different than a direction of said second particle treatment beam with the features of claim 11 for resulting multidomain device so that attributing large view angle (col. 6 lines 19-31).

### ***Response to Arguments***

Applicant's arguments filed on 11/20/2006 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are follows:

Callegari only discloses a single ion beam exposure to an alignment film to achieve a desired alignment, Callegari does not disclose or suggest "wherein said dry deposited layers are exposed to at least a first particle beam treatment and a second particle beam treatment; wherein a direction of said first particle beam treatment with

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respect to said dry deposited layers is different than a direction of said second particle beam treatment with respect to said dry deposited layers."

Examiner's responses to Applicants' ONLY arguments are follows:

Application only discloses (Fig. 14a-b) a single ion beam 10 exposure to an alignment film to achieve a desired alignment in different directions. Therefore, application discloses the first and second particle beam treatment are a single ion beam with different directions (page 12 lines 7-14, page 12 line 28 to page 14 line 32, page 21 lines 9-16). Nowhere in application discloses two beams with different ions in different directions as following:

The dry deposited layer is aligned by bombardment from the ion beam source 10 (same ion beam). The direction of the ion beam bombardment is depicted by the arrows (page 13 lines 25-27).

Fig. 14b, shows a photoresist (PR) layer 16, having one or more openings 16A, placed directly above the dry deposited layer 14. The dry deposited layer is aligned by bombardment from the ion beam source 10 (same ion beam). The arrows depict the direction of the ion beam bombardment (page 13 line 29 to page 14 line 2).

When one area of the pixel in Fig. 1 is bombarded, other areas are covered by a mask, such as a mechanical mask (Fig. 14a) or a photo-resist mask (Fig. 14b). However, the first bombardment can be done either with or without a mask since, if no mask is used, the direction of the second bombardment (with the same ions or particles) will overwrite the first bombardment direction (page 14 lines 4-10).

The first and second bombardments must use the same ion source 10 with different directions.



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The direction of the ion bombardment in each domain on the second (top) dry deposited layer is also different. With the ion beam treatment on both the bottom and top dry deposited layers, a two-domain TN "twist nematic" panel will be formed after the panel is filled with left-handed chirality liquid-crystal.

If right-handed chirality liquid-crystal is used, the ion beam bombardment direction should be changed accordingly (page 14 lines 23-32).

The left-handed and right-handed chirality liquid-crystals are formed by the ion beam treatments with the same ion source 10 with different directions.

In Fig. 2 and 3, each dry deposited layer requires four ion beam treatments. In Fig. 4 and 5, each dry deposited layer requires only two ion beam treatments (with the same ion source 10).

Thus, for the first ion beam treatment a mechanical mask is not necessary. However, a mechanical mask is needed for any ion beam treatment other than the first ion beam treatment, since the second ion beam treatment will overwrite the first ion beam treatment (page 15 lines 18-25).

The two ion beam treatments do not indicate that different ions are used for different treatment. However, the two ion beam treatments indicate two times treatment with ion beam bombardment with same ion source 10 to overwrite the first ion beam treatment with the second ion beam treatment. There is no disclosure shows that the first and second ion beam treatment used different ion sources.

The photo-resist method includes the steps of: depositing on a conductive layer on a substrate a material to form a dry deposited layer; partitioning the dry deposited layer into first domain areas and second domain areas of the dry deposited layer; bombarding the dry deposited layer with a first ion beam without a mask; thereafter covering the first domain areas of the dry deposited

layer with a mask leaving the second domain areas open; bombarding the second domain areas with a second ion beam; and removing the mask (page 16 lines 13-23).

However, the first ion beam treatment and the second ion beam treatment come from the same ion source 10. **There is no disclosure shows that the first and second ion beam treatment used different ion sources.** "first" and "second" only indicate the first time and second time with the different directions, which ion beams are exposed on alignment films.

Therefore, the first and second ion beam treatments in the disclosure of the instant application may interpret as **a single ion beam treatment exposure with same ion source 10 to an alignment film to achieve a desired alignment in different directions.**

Callegari also discloses **a single ion beam treatment exposure to an alignment film to achieve a desired alignment** in different directions (col. 6 lines 29-31).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAN C. NGUYEN whose telephone number is (571) 272-2296. The examiner can normally be reached on MONDAY-THURSDAY:8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Art Unit 2871

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